THE AMERICAN JOURNAL
OF
OPHTHALMOLOGY

VOL. XXX. APRIL, 1913. No. 4

ORIGINAL ARTICLES.

REMARKS ON HOLES IN THE MACULA LUTEA AND FOVEA CENTRALIS WITH THE REPORT OF A NEW CASE*.

By Adolf Alt, M.D.,
ST. LOUIS, MO.

Herman Knapp, as the first, saw in 1869 as described in the Archives of Ophthalmology, Vol. I., p. 177, with the ophthalmoscope in an eye which had suffered a severe contusion besides several isolated ruptures of the choroid, a peculiar change in the retina which was localized exactly in the macula lutea. It was characterized by a round red spot which he at first considered to be a retinal hæmorrhage. The further and clear description of the later ophthalmoscopic changes in this spot, make it all but certain that this was the first case in which a hole in the macula lutea was seen ophthalmoscopically.

Since that time a comparatively large number of authors (Noyes, Loomis, Kuhnt and Haab, Fuchs, de Schweinitz, Zentmayer, Reis, etc.) have described cases in which they made the ophthalmoscopic diagnosis of a hole in the macula, which, however, never came to a microscopical examination.

From a review of these cases it is evident that we must differentiate between cases in which the hole formation is found in connection with other affections of the eye and, so to speak, spontaneous,—and cases in which the formation of a hole followed a trauma whether this was simply a contusion or a perforating injury.

*Read at the meeting of the St. Louis Ophthalmological Society, March 24th, 1913.

In a certain, but much smaller number of cases a hole in the macula or fovea centralis has been found on microscopic examination, in which an ophthalmoscopic examination or diagnosis had previously not been made (as, also, in two of my cases).

The first one of these is probably the one pictured in Pagenstecher and Genth's Atlas of the Pathological Anatomy of the Eyeball on Plate XXV. Among others, the pathology of holes in the macula has more recently been studied by G. Coats who, in 1907 in the Royal London Ophthalmic Hospital Reports, published an excellent paper on this subject with beautiful illustrations, giving the microscopical findings in four cases in which no previous ophthalmoscopic examination or diagnosis had been made.

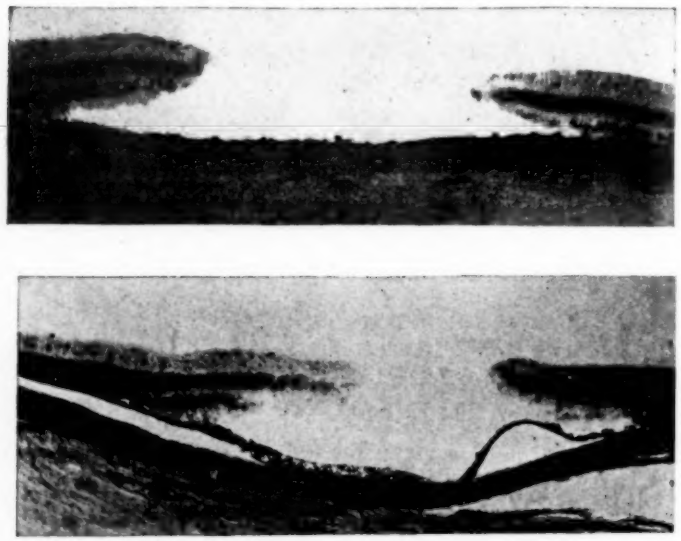

FIG. 1.

Since then a number of similar cases have been described by others. Parsons (Pathology of the Eye, Vol. IV., p. 1365) describes a hole in the macula of an eye of a child afflicted with amaurotic family idiocy in which the hole was evidently due to the congenital absence of the nerve fibre layer.

The first case in which a macular hole had been seen with the ophthalmoscope and in which this condition was verified by the microscopical examination was the one of which it was my good fortune, in 1908, to show you at first the macroscopical appearance and later on the microscopic sections. As you, perhaps,

remember, the case—one of a bullet having passed through the orbit into the brain,—had been seen by my friend, the late Dr. Ch. J. Kipp, who enucleated the eye four days after the injury had been received and sent it to me for microscopic examination. It is described in the AMERICAL JOURNAL OF OPHTHALMOLOGY, Vol. XXVI. p. 225. A photographic illustration of it appeared on page 353 of the same volume. See Fig. 1.

In 1911 Fuchs published a paper on holes in the fovea centralis (Lochbildung in der Fovea centralis. Von Graefe's Archiv fuer Ophthalmologie, Vol. LXXIX. p. 42).

In this paper he reports two cases of holes in the fovea centralis. The alterations which he describes were found during the microscopic examination of two blind eyes without a preceding ophthalmoscopic diagnosis. The conditions he found and which prompted his paper materially differ from what had been previously seen in such cases. In the one eye the hole in the fovea—if it ever had existed—was at the time of Fuchs' examination filled with what he considers a newly formed tissue, so that there was no longer a gap; in the other eye Fuchs speaks of a marked "thinning out of the fovea" after a contusion of the eyeball. In the illustration to this case the abnormal fovea appears considerably thicker than it should be. Therefore, in this case, too, a newformation of tissue must have occurred, although there seems to have been no real hole.

Though these two were certainly not typical cases, in so far as there were no holes present in the fovea when Fuchs examined and described them, Fuchs in summing up the typical cases rejects the case of Parsons and the one Kipp and I had examined as differing from the usual ones, because, as I myself had already stated, the hole in our case may, perhaps, have been due to a direct rupture of the retina in the macular region when the injury was received as the eyeball was scraped by the bullet which tore the optic nerve on its passage through the orbit. Why a manifest hole in the macula lutea which had been seen, two days after the injury was received, by means of the ophthalmoscope and which in the microscopic section can be easily seen with the naked eye, since the edges of the retina are fully 1 mm. apart, should not be looked upon as belonging to the typical class of cases, more especially because its edges were still ragged and had not had time to become smooth, I fail to understand, excepting for the fact that, unlike all the other reported typical cases, it had been seen both ophthalmoscopically and microscopically.

I, also, cannot understand, how C. A. Clapp in an article on macular holes in the February, 1913, number of the *Ophthalmic Record* (p. 83) could make the following statement about this case: "The eye was enucleated and examined by Alt who found a depression at the macula which he *called* a hole at the macula"!

Yet, the hole at the macula in this case, as you again see from the specimens and photographs passed around, remains a hole at the macula, typical like all the others that have been reported.

Since this is to this day, as far as I know, the only case in which a macular hole had been seen with the ophthalmoscope and the diagnosis was confirmed by the microscope, it is in my humble opinion the most valuable of all the cases on record and should be regarded as such.

It is rather queer that the histological appearances in this case agree so fully with those of Coats' second case (Fig. 4) that it might appear as if his and my sections were made from the same eye.

In 1911 (American Journal of Ophthalmology, Vol. XXVIII. p. 161) I had occasion to describe a second case of this kind, although in this case the hole concerned probably the fovea centralis only and was so small that it could not have been recognized with the ophthalmoscope. Strange to say, as you see from the photograph, this hole in the fovea is almost exactly like the one depicted in Coats' Fig. 6. There had been no injury and I enucleated the eye on account of a sarcoma of the iris and it showed other pathological conditions as I have described in my article.

In trying to explain the causes for such hole formation in the macula or fovea based on an analysis of the then published cases Fuchs mentions:

"1. Spontaneous inflammation of the whole eye without perforation like iridochoroiditis, or the retina alone, like albuminuric retinitis and neuroretinitis.

2. Disturbances in the nutrition of the retina as in pigmentary retinitis, in familial amauritic idiocy, in arteriosclerosis, or after the use of X-rays.

3. Detachment of the retina.

4. Perforation with subsequent inflammation through an injury, operation (discission, cataract extraction) or a corneal ulcer.

5. Contusion without perforation. *This is the most frequent cause* of hole formation.

6. In some cases the cause remained unexplained. In old people senile changes might be thought of."

To these we now must add: 7. An intraocular tumor (my second case).

Coats concludes, as Reis had done before him, that:

"Macular holes are produced by an œdema of the retina at the posterior pole. The œdema may not be confined to the region of the fovea, but the appearance of a hole will only be produced if there is a defect at least of the inner layers of the retina. Possibly for the completely typical picture without membranes or shreds, a total defect of all the layers of the retina is necessary. The œdema may result from a contusion, in which case it is the same as the œdema which produces Berlin's opacity; or it may arise from toxins in the vitreous, the result of iridocyclitis; or from retinal vascular disease."

He then adds: "Rupture of the retina at the time of injury is *not* the cause of macular holes."

It is, of course, impossible to state with absolute certainty that in the case described by Kipp and myself the macular hole was due to such a rupture *at the time* of injury, yet it seems quite likely, since as stated it was observed on the second day after the injury had been received and the eye was enucleated on the fourth day.

The statement which Coats makes must, therefore, it seems in the light of our case, be modified.

There seems to me, also, to be a difference between a large hole which comprises the whole macula lutea as in a case of Pagenstecher and Genth, the one of Coats' and ours, and perhaps, some others, and a hole which only concerns the fovea centralis as in one of Coats' cases, perhaps in one of Fuchs' cases and in my second and third case. Perhaps a tear in the macular region is necessary in the former cases, while in the latter, perhaps an œdema is sufficient to produce the lesion.

In my second case, as you see from the photograph, there was comparatively little evidence of œdema, yet there is still a small amount of exudation lying between choroid and retina, and in the gap. This exudation had a slightly bloody tint. There was probably some hæmorrhagic effusion in the history of this case.

I am now in a position to report to you a third and most interesting case.

Through the kindness of Dr. M. Wiener, of this city, I have recently come into the possession of an eyeball which he had

enucleated. The histological findings in this case appear to be of especial interest in that they seem to show clearly that an œdema alone can be and perhaps is responsible for the formation of a hole in the macula, as Coats and others have assumed.

The following history was kindly furnished by Dr. Wiener:

"A. A. D., 14 years of age, while holding a cap (dynamite?) before a stove, was injured in the left hand and in the left eye by an explosion on October 29th, 1912.

I first saw the patient at the Hospital in the afternoon of October 30th. There was a penetrating wound of the left eye just above the corneal margin in the vertical meridian. The wound was clean cut and about 1.5 mm. long. The iris was caught between the wound lips, but was not protruding. The pupil was contracted. The vitreous body was fairly clear so that the path of a foreign body could be traced in it in a down and outward direction. The foreign body, however, could not be seen. Atropin 1 per cent. instilled 3 times daily.

On November 1st, there was very little irritation and the pupil was dilated. The patient was given an injection of anti-tetanic serum. He left the hospital and was ordered to report at my office the next day.

He did, however, not appear until November 4th. Now, even by ordinary daylight a small bright metallic particle, looking like burnished copper, could be seen suspended in a strand in the vitreous body. With the ophthalmoscope another still smaller particle could be seen further back. The larger particle appeared flat, nearly 2 mm. in diameter, rather rhomboid in shape.

On November 5th the patient was placed before a giant magnet, but the result was negative.

On November 11th, under general anæsthesia, I attempted to extract the foreign body with forceps. Although I could see it plainly, it again and again eluded the forceps which in its stead only grasped the slippery vitreous body. Finally so much blood had accumulated in the anterior chamber that further attempts appeared useless and the eye was enucleated. The healing was uneventful."

The well hardened eyeball was cut in to an anterior and posterior half for examination. The region of the wound and the general conditions of the eyeball presented nothing of especial interest either macroscopically or microscopically. An exception is made by the region of the macula lutea. This part of the retina on macroscopical examination appeared somewhat

swollen and protruded into the vitreous chamber, thus inviting a special examination which, it seems to me, proved to be exceedingly valuable in its results. See Fig. 2.

On microscopical examination this localized swelling of the macular region appears to be solely due to an œdema confined to this particular part of the retina.

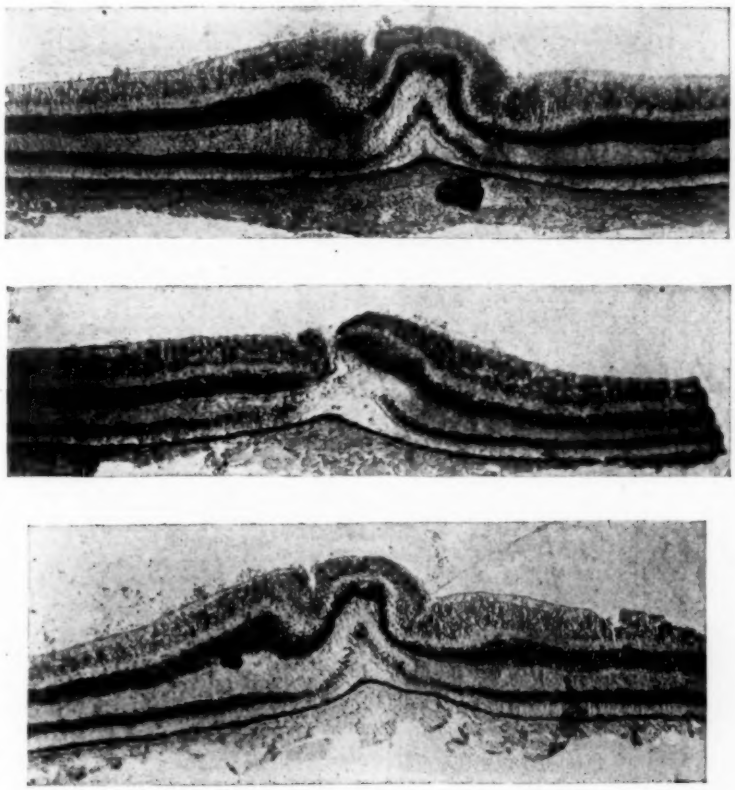

Fig. 2.

The choroid is hyperæmic throughout, but perhaps more particularly so behind the macula lutea, at least it is thicker here, and projects somewhat into what Schaefer termed the outer fovea centralis.

The considerable swelling and folding of the retina is plainly seen to be due to the formation of numerous cavities between the fibres and cells chiefly of the outer layers of the retina which, however, do not resemble the spaces found as a rule in the

periphery of the retina (Ivanoff, Blessig) and those drawn in two of Coats' cases. On account of the early enucleation there has been no time for sufficient destruction of the tissues to produce such comparatively large cavities. These cavities have in life undoubtedly contained some fluid which has produced the swelling and the formation of several folds and pressed the fovea and macula inwards towards the vitreous body.

When viewing the different layers of the retina in turn from the outer to the inner surface we find the following conditions: The cells of the pigment epithelium appear frayed on their inner surafce as if they had been pulled inward after having been previously adherent to the retina. The structure of the

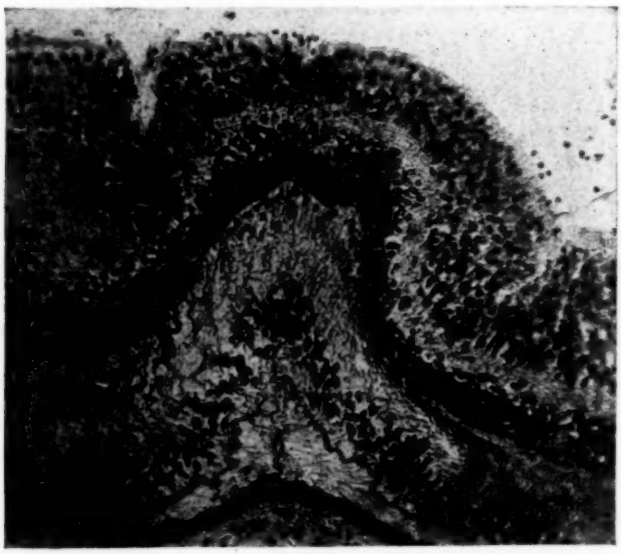

Fig. 3.

cones has disappeared and in their place there is a mass of wavy threads which are separated by cavities, and instead of pointing outwards toward the pigment epithelium, have been drawn or pushed inwardly in such a manner that their formerly outer ends now meet and form a wavy line running at right angles to the surface of the choroid forward towards the inner layers. In the same manner the outer limiting membrane appears like a wavy thread and forms a sharp angle towards the outer nuclear layer. This angle is repeated by the nuclei of the outer nuclear layer which are reduced in number, altered in shape

and separated from each other. The largest amount of exudation seems to have been lodged in the outer plexiform layer between Henle's fibres. There has been considerably less exudation in the inner nuclear and inner plexiform layers, and hardly any in the ganglion layer. See Fig. 4.

These changes together with the swelling and folding of the tissue of the macula were due to the œdema which is represented by innumerable microscopical cavities in these layers. It is not unlikely that this condition in reality corresponds to the œdema sometimes seen in the macular region after contusions and which has been so exhaustively studied by Berlin. The only discrepancy I can see, lies in the fact that Berlin's œdema usually disappears in a week or so without leaving a trace.

FIG. 4.

Yet, a hole in the macula lutea has been seen to develop later in just such cases. And this renders our case the more interesting, since in several sections through the fovea centralis the œdema has evidently produced a minute hole in the tissues which later on might have led to a plainly visible hole formation.

At that particular place, again viewing the retinal layers from without inward, we find the cones gone altogether. There is, also, a gap in the outer limiting membrane which here on the peripheral side forms not a wavy line as we saw in more peripheral parts of the macula, but a straight line bent inward, show-

ing that it had been stretched considerably before rupturing. On the side toward the optic papilla it cannot be made out and must have been torn away or become perfectly disintegrated.

There are few nuclei of the outer nuclear layer and they together with some detritus and a larger mass of nuclei of the inner nuclear layer are in the act of being forced through an opening in the inner plexiform, the ganglionic layer and the limitans interna. This latter membrane forms a wavy line in the neighborhood of the hole and some extruded nuclei lie upon it. See Fig. 4.

The picture is such that it impresses one at once with the idea that the œdema having caused an amount of pressure and consequent destruction of the tissue elements which they could no longer withstand had finally suddenly burst through an opening in the inner layers and the inner limiting membrane, and that the current of the liberated fluid had drawn nuclei and fibres in its course inward towards the vitreous chamber. That the hole is not clean cut as it appears in older cases is, of course, perfectly natural, as the partly destroyed parts have not yet been shed and absorbed, nor has there been time for the formation of scar tissue.

Just outside of the macula the retina assumes its normal appearance, even the rods and cones show no pronounced pathological changes. This is the case in the direction of the optic papilla as well as in the direction toward the periphery of the retina.

It seems from this specimen, which evidently represents a very early stage of the formation of a hole in the fovea centralis, that a high degree of hyperæmia of the choroid may with the aid of some mechanical or chemical influences lead to a localized œdema in the macula lutea and its nearest surroundings which, if it persists long enough, may lead to a rupture of the inner layers and the inner limiting membrane and thus may cause the formation of a hole. It may seem doubtful that such a process alone would account for as large a macular hole as Pagenstecher and Genth, Kipp and myself and Coats have found, although there is nothing to prevent a small hole in the fovea centralis from growing into a larger one in time.

THE REPORT OF A CASE OF SYMPATHETIC OPHTHALMIA, DEVELOPING SEVEN DAYS AFTER OPERATION. TREATED BY NEO-SALVARSAN; RECOVERY.

By F. Phinizy Calhoun, A.B., M.D.,
ATLANTA, GEORGIA.

The recovery of a case of sympathetic ophthalmia with useful vision, is by no means a common occurrence; the rapidity of onset, the treatment with salvarsan and the other phases, make this case one of unusual interest.

B. S., a fairly developed collge boy of 21 years, consulted me September 10, 1912, on account of bad sight in the left eye, and principally of the advisability of having an artificial pupil made, having been treated and urged by a competent ophthalmologist in a distant city that such a procedure was possible and advisable.

Family history: One uncle has arthritis deformans, and most of his immediate family complain of rheumatism.

Past history: Patient been well and healthy except for attacks of rheumatism and tonsillitis. The right tonsil was removed some years ago, the left is now enlarged and constantly inflamed. Patient says his mother keeps a good table, that the family eat heartily and he especially of meats. He had iritis in the left eye in 1908 from which he recovered with some vision. Two years later a second attack, in 1911 a third attack in the same eye. Patient admits that the first attack was not treated until two weeks after onset. He has been under medical advice until a few days before consulting me and was advised that an operation for an artificial pupil was indicated for the left eye, which was blind.

Examination.—Right: vision 20/15 with a —.50⌒—.50 ax. 135=20/15 under homatropine. Fundus normal, except a small atrophic spot of choroiditis between the papilla and macula and about one-fourth the size of the papilla. Tension normal. Left: occluded and secluded pupil, iris bombé, tension slightly minus, good perception of light. Exterior of eye normal and no injection of globe.

An iridectomy was advised but not for visual purposes, as it was my intention to remove the iris in the upper segment. The patient and his father well understood the reasons for an opera-

tion and I even ventured a warning that at some later day the eye would undoubtedly require an enucleation.

The operation was performed the same day, but on account of a very unruly patient, besides an iris bound by adhesions to the anterior surface of the lens, a very incomplete and unsatisfactory iridectomy was made. The following day the chamber was restored, and I could easily detect a slit-like opening in the iris. There was very little reaction to the globe and the patient felt comfortable. I ordered atropine solution, potassium iodid and mercury in appropriate doses. The next day the iris looked muddy and continued so. Seven days following the operation, he complained of the light hurting the *right* eye, and noticing some engorgement of the deeper vessels, I dilated the pupil again and found about 15 small round precipitates on the posterior surface of the cornea; no other new change noticed in the fundus. Undoubtedly this was a beginning sympathetic ophthalmia.

I explained the gravity of the situation to the young man and communicated with his father over the long distance telephone, and within half an hour the left eye had been enucleated and active treatment begun on the right eye. He was placed in bed in a dark room and ordered for the eye constant hot bathing, atropia, dionin, and internally soda salicylate, mercury, potassium iodid and hexamethylenamine. Day by day the eye grew worse. The sclera became more injected, the vitreous more hazy and the retinal veins tortuous and dilated, but fortunately the patient suffered no pain.

As the treatment did not seem to check the progress of the disease and as the dosage was very unsatisfactory on account of a delicate stomach, I decided to have given 7/10 gram of neo-salvarsan, notwithstanding a negative Wassermann made a few days before. This was 16 days after the iridectomy, and 9 days after the enucleation. For the following four days the engorgement increased and sight rapidly diminished. Then the height of the disease seemed to have been reached and slowly for ten weeks was the eye clearing, and when dismissed, December 22nd, with the refraction corrected there was 20/40 vision. In communications received since, the patient thinks his vision is much improved.

Alterative treatment was continued after the intra-venous injection of neo-salvarsan, yet at no time could the patient tolerate more than 30 drops of a saturated solution of potassium iodid at a dose, and 2 drams of the inunction of mercury a day.

The salicylate of soda could not be increased beyond twenty grains and hexamethylenamine was given in average doses.

In conclusion, the case presents three important facts:

(1) Sympathetic ophthalmia developed in seven days. Whether there were latent toxines or bacteria present in the sympathetizing eye, which were aggravated and made active by an operation on the sympathetic eye, we cannot say. There were certain evidences of this, if we consider the atrophic area of choroiditis observed before the operation. Although in recovery, this spot has not apparently increased in area or changed its appearance.

(2) The arsenious preparation used, when the case seemed helpless and all drugs seemed useless, apparently had some power in controlling the disease. I am aware that it might have been given at the very turning point or crisis in the disease and its effect overestimated. I feel sure that should I have under my care another case of sympathetic ophthalmia, I would be justified in giving an initial dose and would be tempted to repeat it.

(3) A complete and uneventful recovery.

PARINAUD'S CONJUNCTIVITIS.

R. Argañaraz (*Semana Medica,* April 4, 1912) expatiates on the necessity for differentiating the conjunctivitis described by Parinaud from other forms of conjunctivitis, stating that it is not contagious, and that it is impossible to reproduce the affection in animals. In man it runs a relatively mild course, healing in from seven to ten months without leaving any trace. The cornea and the lacrimal passages persist intact throughout its entire course. The assumption of an animal origin is problematic, he continues, and the affection is not tuberculous. The chief characteristics are the inflammation and granulations, the swelling of the lids, the infarct in the lymph-nodes and the fever and anorexia—no other form of conjunctivitis combines these four groups of symptoms. Diphtheria antitoxin injections seem to modify favorably the primary stage of the disease, but he warns expressly against cauterization of the granulations as this is liable to leave complications in the cornea while, left alone, the lesions subside in time completely. The *Bacillus xerosis* seems to have something to do with the affection. He reports in detail three cases in children and one in a brother physician.—*Jour. A. M. A.*

A PROTRACTOR FOR USE WITH THE SINGLE CELL TRIAL FRAME.*

By A. E. Ewing, M.D.,
ST. LOUIS, MO.

A departure from the heavy thick edged mounting for trial lenses, such as is found in the older trial sets, was first suggested by Dr. John Green before the American Ophthalmological Society in 1878. Two years later he exhibited at the same Society "two metric trial cases," one made by Mr. H. W. Hunter of New York, and the other by Messrs. Jas. W. Queen & Co., of Philadelphia, with settings having thin flanges so constructed that two lenses could be placed face to face in the same cell of a trial frame. With this mounting the strongest spherical and cylindrical lenses could readily be used in combination, with their optical centers as nearly approximated as was possible for double convex or double concave lenses, except by having their surfaces in actual contact. He also exhibited a trial frame with three grooves, each of which would hold two lenses, the three grooves having the capacity to carry six trial lenses.

Seven years later, also before the American Ophthalmological Society, Dr. Edward Jackson presented a trial set of plano-spherical lenses so arranged that two lenses could be placed in the same cell of a trial frame for trial purposes; but the lenses were 25 mm. in diameter, instead of the regular standard size, this smaller diameter having been chosen to reduce the weight of the trial lens, while the selection of the plano surface had for its purpose the reduction of the spherical aberration.

Appreciating at once the practicability of this fundamental principle with regard to spherical aberration advanced by Dr. Jackson, Dr. Green had several small sets of full sized trial lenses with the thin flanged rims and the plano lenses manufactured for his own use by Wall & Ochs, and in 1893 a complete case to 24 D. for myself, all the lenses being plano that were stronger than 6 D. These weaker lenses are cheaper than the plano lenses of the same focal length, their aberration is inconsiderable, and their slight curvature is sufficiently protected by the necessary thickness of the flange to prevent their surfaces from being in actual contact.

*Read before the Ophthalmic Section of the St. Louis Medical Society, March 5th, 1913.

Previous to receiving this trial case I had depended on one in which the mountings were of the Nachet type. For the manipulation of the cylinders it was necessary to employ the ordinary revolving trial frames, which are usually arranged to carry several lenses face to face. With the new thin flange mountings it was possible to find single cell trial frames into which a spherical and a cylindrical lens could be placed face to face. This saved the weight of the heavy revolving frames, besides rendering it possible to employ in the examination quite exactly the lens which would be worn in the future, both in respect to the position of the lenses with reference to one another, and in the matter of the position of their newly formed combined lens with reference to the distance from the patient's cornea.

To facilitate the employment of these single cell frames for this purpose, Mr. Erker, of the Erker Bros. Optical Co., kindly enlarged the grooves so as to more readily accommodate the two lenses. This, however, was a difficult task, as the steel proved to be very hard, and it resulted in his prevailing on the American Optical Co. to make a die for the widened groove. Since then such frames have been readily obtainable. Also, within the last few years, Dr. Green has induced the American Optical Co. to manufacture the thin-flanged rim as a part of their regular stock, which renders it easy to obtain lenses with this mounting in large or small quantities.

As these light single cell trial frames lack the degree markings for establishing the axis of the cylinder, it became necessary to depend on an ordinary protractor for this purpose, and the protractor being cumbersome I constructed a diagram based on the diagram for spectacle prescription blanks, which is shown on page 516 in the Reference Hand-Book of Medical Sciences, 1888, in the article on Spectacles, by Dr. Green, placing the 0 at the top of the circle in the vertical meridian and employing the + sign in reckoning to the right and the — sign in reckoning to the left, the method employed by Dr. Green in his clock dial astigmatism chart, and which may also be found on Snellen's Astigmatism Chart, Graefe-Saemisch, 1874, Vol. III. p. 82. This diagram consisted of two circles made up of short radiating meridional lines with five degree intervals, each ten degree interval being represented by a line two millimeters long, and the alternating interval by a line one millimeter in length, the proximal end of each of these lines resting on an imaginary circle exactly

the size of the thin-flanged lens mounting. The circles were placed twenty-one millimeters apart, with their horizontal meridians in the same line, and at their upper margins a dotted line was drawn tangential to both circles. The forty-five degree meridians were represented by lines four millimeters long. To aid further in the accuracy of adjusting the rim to the circle a cross was placed at the center of each circle made of vertical and horizontal lines five millimeters long. The circles were designated by R for *right* and L for *left,* the latter corresponding to the left eye and the former to the right, as the lenses are worn by the patient.

To employ the diagram with the single cell trial frame it was only necessary to place the cylinder of the right eye over the

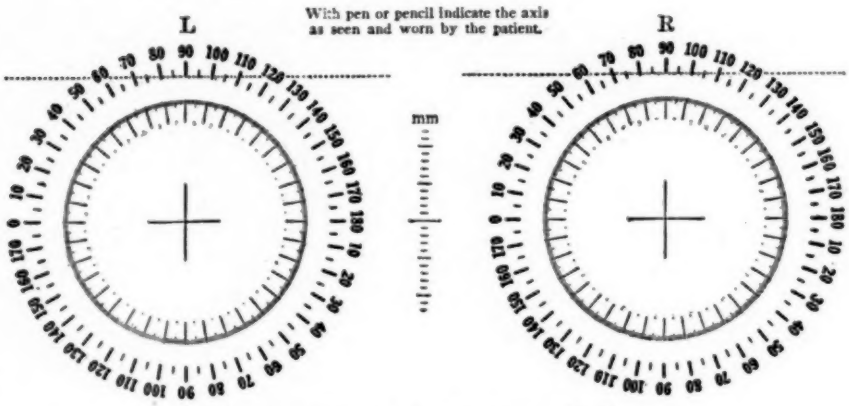

FIG. 1. A protractor for use with the single cell trial frame.

right circle, with the edge of the trial lens of the left eye against the tangent of the left circle, and note the position of the usual short marginal guide line, which indicates the axis of the lens, in degrees on the circle. For the left eye the lens was placed over the left circle with the edge of the right lens against the tangent of the right circle, and the position of the left lens was similarly noted in degrees. This diagram was printed on the prescription blank for the glasses in order to have it always at hand and ready for use. It has proved to be a rapid, correct and satisfactory method for noting the axis of the cylinder when writing the record of the case, and for indicating it with a pen or pencil mark on the diagram for the use of the optician, as it plats the axis of the cylinder or the prism precisely as it is to be worn by the patient.

In the newly constructed diagram here presented, Fig. 1, which is intended to be employed in the same manner, these two principal features, the tangent lines and the two circles of the size of the rim containing the trial lens, are preserved. It is further elaborated by showing the divisions in degrees and by the addition of both an outer and an inner circle, the former a little larger and the latter a little smaller than the rim of the trial lens, the lens being more readily centered by having this narrow light space between the rim and the short radial lines which make up the circles. This same space must be allowed between the rim of the lens of the fellow eye and the tangent of its circle. Also the conventional angular notation generally adopted in the graduation of circles has been restored, as used by Donders, and still in use by probably the majority of ophthalmologists and opticians. As only the one hundred and eighty degrees are necessary for establishing the axis, the numbers are duplicated in the lower half of the circle in order to facilitate the reading.

Another valuable innovation that is being carried out in the cylinders and prisms of the newer trial lenses is the abandonment of the ground glass margins, which are ordinarily depended on for the general direction of the axis, and the employment only of engraved or etched lines near the rim to mark the axis. The ground glass margins tend to disturb the accuracy of the examination by being noticeably in the visual field, and in this way exciting accommodation. Should the lines indicating the axis of the lens not be true with one another, or if these lines are not properly centered in the mounting, the defect is readily detected by this protractor.

CORRECTION.

In the table of values at the bottom of page 70, March number of this JOURNAL, the decimal point should be one place to the right of its present position, so that the values of MO would be: 0.3492 cm; 0.6984 cm; 1.0482 cm; 1.3986 cm; 1.7498 cm; 2.1020 cm; 2.4556 cm; 2.8116 cm; 3.1646 cm; 3.5266 cm.

MEDICAL SOCIETIES.

OPHTHALMIC SECTION,

St. Louis Medical Society.

Meeting of January 8, 1913.
Dr. C. Loeb in the chair.

Report of Cases.—By Dr. Clarence Loeb.

I have two patients whom I desire to present this evening. (1) C. B., male, a carpenter, while hammering a nail on January 3, 1913, was struck in his left eye. He is positive that it was the entire nail and not a piece of it or of the hammer which struck him. He was not rendered unconscious by the blow, but couldn't see with the eye afterwards, although his vision had been good previously. I saw the patient for the first time on January 6th, at which time there was circumcorneal injection, an incised wound of the cornea and a contracted pupil, with some pain. After the pupil had been dilated, it was possible to see the lens. The anterior capsule was intact, but the lens substance showed a number of opacities, arranged in a circle, very similar to those of a beginning senile cataract, but not so far peripherally. They have become larger in the few days he has been under my observation. I have not been able to obtain a view of the fundus, but do not believe there is a foreign body in the eye. I present the case because of the very pretty picture it affords of of a beginning concussion cataract.

The second patient, Mrs. E. S., aged 54, whose vision has been steadily decreasing for two months, without any pain or other symptoms. The left eye was especially involved. I saw her first on December 12, 1912. V.R.E.=1/15 increased to 1/6 by addition of +1.5S. V.L.E.=less than 1/30; no improvement by glasses. Fundus examination under homatropin; right eye shows a dark area in the macula, but no actual retinitis. However, above the macula and rather toward the disc, is an arc of 6 to 8 white dots, which are evidentally the product of a retinitis. No hæmorrhage. L.E.: In the macula is a large, oval white plaque with a small amount of pigment above and below. Examination

of the urine showed no albumin nor sugar. This examination was repeated to-day with the same result. No luetic history could be obtained and the Wassermann was negative. However, under the administration of K.I. the vision has increased to —V.R.E.=6/20, with +1.5S., V=6/15 nearly. V.L.E. 1/20 with +1.5S, V=1/20+. The exact diagnosis is in doubt, except for the diagnosis ex juvantibus of retinitis luetica.

DISCUSSION.

Dr. Jacobs: I merely want to say that in a recent issue of the *Klin. Woch.*, there appeared a paper on "Retino-choroiditis" (Jensen) in which the author describes a condition which bears some resemblance to what we have seen here to-night. It strikes me that the location of these retinal lesions would possibly be in line with the condition described in this paper. The writer reviews the entire literature of this subject and reports 17 cases; he describes lesions which resemble, to a certain degree, those seen in this patient. Their location particularly is what impresses me as being similar. I would suggest that the matter be further looked into. The writer brought out the fact that no luetic or tubercular basis could be found. However, in his conclusion he concedes that when he finished he knew as little regarding the ætiology (excepting the facts just mentioned) as when he started. He also mentions the fact that recurrences, which were frequent, usually come at the site of the former lesion. It would be interesting to know, if this patient can be kept under observation, whether any recurrence takes place after these lesions clear up, and whether the conditions possibly belong in the category, retinochoroiditis (Jensen).

Dr. Green: Although this case does not have the clinical appearance of tuberculosis of the retina, I would suggest the diagnostic injection of tuberculin.

Dr. Loeb, in closing: This case was in a way similar to the one I presented about two months ago—a case which had the same character of white dots in the retinæ, but much more pronounced than in this case. They formed a complete circle around the macula, which was unaffected.

Equivalent Values in Spectacle Lenses.—By Dr. W. E. Shahan.

Practically all the text-books on ophthalmology treat the subject of lenses and the properties of lenses in quite a superficial manner. All distances are measured from the center of the

lenses and all lenses are considered without thickness. Moreover, lens grinders and spectacle salesmen compute the powers of lenses in a simple arithmetical way. A lens with a plus 20 D surface on one side and a minus 10 D surface on the other is a plus 10 D lens, and such a lens will be practically neutralized by a minus 10 lens held against its convex surface. But if such a lens is prescribed for a patient whose hypertropic or aphakial defect is accurately measured by a plus 10 double convex lens, it will be found that the defect is over-corrected by about 2 diopters. This plus 10 meniscus lens has, therefore, an equivalent value of 12 diopters (for Bausch and Lomb glass where the refractive index of the Fraunhofer ray D is 1.5225, and ground with Bausch and Lomb tools, and the greatest diameter of the lens is 40 mm.).

The simple rules which hold well enough for double convex and double concave lenses, fail increasingly with increasing power and change in form. This was shown to be due to two prominent factors: advancement of the second Gaussian point along the axis of the lens in a direction away from the concave surface in collective lenses,—and to absolute increase in power (of collective lenses) with increasing change in form. This was illustrated by diagrams and formulæ. And the "equivalent value" of a double convex lens in terms of a meniscus lens was defined as that double convex lens which, when put into the same rim as that which held the meniscus lens, brings parallel rays to a focus at the same distance from the plane of the rim as the meniscus does. It was shown that all equivalent values could be accurately computed and charted so that when the usual defect is accurately measured with double convex or plano-convex lenses, the value of any corresponding meniscus can be read off without the labor of tedious computation. Such work is now being carried out and will be available in two or three months. The logarithmic computation is tedious and at least this much more time will be required for its completion. A method of computing the thickness of any double convex or meniscus lens when the diameter and radii of curvature of the two surfaces are known, was also explained in detail.

It will be realized at once from the above statements, that when visual defects are measured accurately with double convex or plano-convex lenses and the glasses are ordered in meniscus or toric form, the result will be an over-correction which will be small for weak lenses and increase to amounts which cannot be

neglected as the lens becomes stronger. It is to render available for immediate practical use the advantages of diminished astigmatism of oblique pencils and flatter fields that graphs of equivalent values in spectacle lenses are being prepared. The intention is to prepare these for Bausch and Lomb glass where N D= 1.5225 and for American Optical Company glass where N D= 1.507, and arrange formulæ for making the same calculations for any other variety of glass of which N D is known.

It was also shown that meniscus lenses, equivalent to double convex lenses, have telescopic properties which the double convex lenses in the ordinary position do not have. It thus happens that the visual acuity measured accurately with double convex lenses is somewhat greater with the corresponding equivalent meniscus or toric lenses, because of telescopic magnification. Emphasis was laid upon the fact that the ordinary neutralization test fails to discover these discrepancies in equivalent values.

DISCUSSION.

Dr. C. Barck: This paper by Dr. Shahan interested me very much, and I want to congratulate him; more especially so, because mathematical subjects are rarely brought before this section.

His calculation of the thickness of a lens from the two known quantities, namely, the radius of curvature and the diameter of the lens, is very clever. And in lenses of higher degree their thickness is no negligible factor, as is well known.

In regard to the second part of his paper, I beg to differ somewhat. It seems to me that he approached the subject from an erroneous premise. When calculating the respective foci from the positive and from the negative surface of a meniscus, he measured from the base-line (referring to the drawing) and proved that there was a difference. But if you measure from the center of the meniscus, as measured in the case of the biconvex lens, or if you place the meniscus upon the base-line, there will be no difference. In other words, the difference in focus is no inherent quality of a meniscus, but depends on its location. If I understood the tenor of Dr. Shahan's paper correctly, he seemed to assume the former.

Whilst dissenting in respect to his theoretical foundation, I fully agree with him as to this fact, that a meniscus, if placed before the eye, gives a different focus than a biconvex lens of

the same respective value placed before the eye. (Example: a meniscus with a concave surface of 10 and a convex surface of 21 will have a different focus than a biconvex lens of 11). But the reason for this difference lies in the position of the lens in reference to the eye; the center of the meniscus is more remote from it than the center of the convex lens. If you place the latter further away from the eye, into the position of the meniscus, the focus will accordingly recede; and if you want to retain the first focus with the lens in the second position, you will have to increase its strength. As we are hardly able to change this forward position of a meniscus, it is necessary to bear in mind that a simple mathematical calculation will not do, if we want to substitute a meniscus for a biconvex lens. We must add one to two diopters to the convex surface. Example: Plus 10 is not equivato a meniscus of "minus 6 and plus 16.", but to a meniscus of "minus 6 and plus 17 or 18." The amount of the necessary addition increases the curve proportionately to the increase of the concave surface; if the latter is of small degree, it is a negligible factor; if of high degree, it is very important. The exact amount of the addition in a given case depends upon the nearer or farther position of the meniscus from the eye, and this again depends upon the frame, the configuration of the face, etc. For this reason it is difficult to estimate the exact addition when testing with the frames of our test-cases.

This subject is certainly a timely one; for I believe that frequent mistakes are made with menisci, and furthermore, that we do not make use of them to the full extent of their utility. The only scientific communication which appeared in medical literature, so far as I know, is by Ostwalt. His first article appeared in 1898 and the second in 1900, in Graefe's Archives. Basing his investigations upon the distinctness of peripheral vision, he calculated the best concave surface of the equivalent meniscus for all concave and convex lenses from 1 to 20 diopters. For cataract lenses he found that the best concave surface is one of a minus 11. This would give for a plus 11 an equivalent meniscus of "minus 11 and plus 22" theoretically; and "minus 11 and plus 23 to 24" practically (after the necessary addition, as outlined above). I copied his table, and keep it since then near my test case for ready reference. But there is one difficulty encountered. The opticians are provided by the large houses, like Bausch & Lomb, with two forms of menisci only; the one with a concave surface of minus 1.25 and the other

with a concave surface of minus 6.0. The price for these is moderate. All the other menisci must be ground by the optician and the price is rather high, especially for cataract lenses.

"Meniscus" and "Periscopic lens" are synonyma. At present the latter term is more frequently used than the former and older one. Menisci were ground centuries ago by the Venetians, although their qualities were unknown. It was Wollaston, an English physicist, who discovered in 1803 that such lenses give a superior peripheral vision, and he introduced the term "periscopic" lenses for menisci and advocated their use. But his discovery fell into oblivion for a long time, and it is only in the last twenty years that their practical use came more and more into vogue. The mentioned essay by Ostwalt contributed to this.

Lately the firm of Bausch & Lomb sent a chart to many opticians and oculists, which contains three pictures. Uppermost a biconvex lens; then a lens with a concave surface of minus 1.25, which they call a periscopic lens; and finally a lens with a concave surface of minus 6.0, which they call a meniscus. I wrote them a letter and drew their attention to the erroneous distinction between these two terms, which they tried to introduce. Their reply was, that the trade uses these two words in order to distinguish readily the two kinds of menisci, which are in the market. As a matter of fact, it was their firm which introduced the new and wrong definition of these terms into the trade. The question for us is, whether we will submit to the trade and prescribe only the mentioned two forms of menisci (with —1.25 or —6.0), sacrificing thereby our scientific conscience; or, whether we will prescribe the meniscus, which has the best concave surface and force the opticians to reduce the price for menisci ground to order.

As far as the use of menisci is concerned, many points are still unsolved and I am convinced that their usefulness will increase in the future. For this reason I feel indebted to Dr. Shahan that he has brought up this matter as well as for the interesting manner in which he has handled it.

TRANSACTIONS OF THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

January 9, 1913.
Dr. Wendell Reber in the Chair.

[*Continued from the March Number*].

EXHIBITION OF CASES.

The Treatment of Dendriform Ulcer of the Cornea.—Dr. William Campbell Posey.

Dr. Posey spoke of the various types of superficial inflammation of the cornea which were associated with dendriform opacities, and referred to the infrequency of dendriform ulcer in women. He had recently had under his care a number of young men with dendriform opacities, in whom a persistent conjunctivitis apparently played an important part. In the treatment he thought that at first all irritation should be avoided, cauterization of the cornea being only resorted to when the opacity showed a tendency to spread and to resist milder measures. He preferred carbolic acid to other drugs, care being taken to limit the application of the crude acid to the part affected.

Subsequent applications of an ointment containing atropin, iodoform and vaseline relieved pain and promoted healing. He had found holocaine of little value in the treatment of this affection.

DISCUSSION.

Dr. Zentmayer said there is a wider acceptance of the view that dendritic ulcer, herpes cornealis, superficial punctate keratitis and allied superficial forms of keratitis are of neuropathic origin than formerly, but he did not consider the evidence sufficient to include all within this ætiology. As to the treatment, his attention to the value of holocain in these conditions was called some years ago by de Schweinitz's memorandum of the value of this drug in relapsing erosions of the cornea and he has since used it in all corneal conditions, and he thinks with decided advantage combining a compress bandage in some forms. Finding that oil of turpentine next to the solid stick of nitrate of silver was the most efficient treatment for aphthous stomatitis he was led to use it in corneal ulcers and it seems to be of special

value in dendriform ulcers. He recalled that in a very pronounced case of filamentous keratitis which had resisted all forms of treatment he had at the suggestion of Dr. Posey employed a strong yellow oxide ointment with benefit.

Dr. Sweet advocated the use of holocain and drew particular attention to the way in which holocain solutions seemed to vary, not only in their anæsthetic properties but in their irritative properties. In his hands some solutions had seemed to be so much more irritating than the average solution that he was led to speculate on whether the chemical itself always came into the market in the same condition.

Dr. Reber also endorsed holocain and was not persuaded that malaria occupied the prominent place in the ætiology of this disorder that was once ascribed to it. Anything which induced a neurotrophic state might well be the cause of the dendriform ulcer of the cornea. In this sense a neighboring dental or nasal disorder might easily prove to be the existing factor.

W. Walter Watson, M.D.,
Secretary.

Meeting of February 13, 1913.

Dr. Wendell Reber in the Chair.

Complications During and After Cataract Extraction.—Dr. William Campbell Posey.

Dr. Posey said that many of the complications which arise may be avoided by the development of skill in operating acquired by practicing upon the eyes of the lower animals, before essaying the extracting of the lens from the human eye. Great care should be exercised in selecting proper instruments. A badly constructed speculum is responsible for many accidents. He preferred the Murdock. The cystotome must be sharp and dislocation of the lens during extraction and subsequent loss of vitreous may often be avoided by a skillful handling of this small but important instrument. He warned against dipping the point of the knife too deep into the angle of the anterior chamber at the point of counterpuncture. A well placed conjunctival

flap hastens healing and prevents later complications. Loss of vitreous often occurs from gaping of the wound in consequence of the patient's being directed to look down too far. A skillful and experienced operator will have loss of vitreous in but few cases. He deprecated the performance of the Smith operation on account of the loss of vitreous which it so often entails. He prefers the simplest manner of extracting with iridectomy. While most cases of infection arise from external sources, from germs in the conjunctiva or from unclean instruments or drops, endogenous causes operate at times, especially in gouty and diabetic cases. An active internal medication directed toward the sublying systemic cause, must always be joined with the local treatment in all such cases. Rise in tension is due either to a change in the nature of the intraocular fluids or to obstruction of the angle of the anterior chamber by iris, lens capsule or other mechanical cause. Division of the obstructing band can often be accomplished by a sharp knife needle. The blood which may fill the anterior chamber consequent upon iridectomy is seldom of consequence, but the massive hæmorrhages which at times occur and are dependent upon ruptures and varicosities in the choroidal veins usually demand enucleation. With the first symptoms of that most dreaded of all complications, panophthalmitis, the lips of the wound should be cauterized and hot compresses applied. Mental disturbances arise on the 2nd and 3rd day after operation in nearly 10 per cent. of all cataract cases. The cause is largely psychic, dependent primarily upon impoverished brain cells in consequence of sclerotic vascular changes. Normal cerebration returns in a week or more, insanity arising only in cases who had manifested mental changes prior to operation.

Unusual Procedures in Cataract Operations.—Dr. William Zentmayer.

Preliminary iridectomy may be performed either as a preparatory operation for the extraction of a ripe senile cataract or an immature cataract either in a young individual or in the aged. In the first class of cases it is comparatively rarely done, in the second it is usually associated with some procedure calculated to induce maturation of the cataract, and in the last class it may be done to avoid the greater danger of dense secondary when the combined operation is done. In this class the preliminary

operation is not frequently done as experience has shown that there is little cortical remaining at this time of life.

Ripening operations may be done with or without iridectomy. In the earliest, Foerster's, an iridectomy was combined with massage of the lens through the cornea; later Bettman, White and others did direct trituration by the introduction of a spatula into the anterior chamber with which the lens capsule was stroked.

About ten years ago, Tynen, of Texas, who was performing capsulotomy as the first step in cataract operations, stated that he thought that at the extraction of immature cataracts the lens escaped more readily. Some years later Homer Smith advocated preparatory capsulotomy for the purpose of ripening the cataract. His operation consists in making a crucial incision in the anterior capsule with a specially devised miniature scalpel and 24 hours later delivering the lens. Later Fridenberg modified the operation by two peripheral parallel incisions so that a capsulectomy could be done at the time of the extraction of the lens.

For the extraction of immature cataracts the Smith Indian operation is applicable. (Operation described.)

The use of corneal sutures to aid in early union of the lips of the wound was discussed. They were considered of value in cases where loss of vitreous was anticipated. The sutures should then be inserted before the section is made, the suture being of sufficient length that the loops may be drawn aside while the section is being made.

The advantages of having a complete conjunctival flap has led to the adoption of the usual procedure of injecting a few drops of some sterile solution in the conjunctiva in the position of the counterpuncture so that the point of the knife can be carried the required distance under that membrane after emerging from the corneal tissue. In making the puncture the point of the knife is entered under the conjunctiva before penetrating the corneal tissue. If the knife is brought out subconjunctivally on finishing the section, a complete conjunctival flap will have been secured. The recent Belgian method is ingenious and has but one objection, the danger of infection by the presence of two sutures. In operation the conjunctiva is freed from the upper limbus over the area included in the corneal incision and undermined for some distance. A suture is inserted at either end of the conjunctival flap and brought out on the bulbar conjunctiva at the limbus a short distance below the point where

corneal incision starts; by tying the two ends of each suture the conjunctiva is drawn down over the cornea, completely covering the corneal incision. Couching of the lens might be necessary to give sight to an insane person with cataract or it might be called for in the presence of a virulent conjunctival secretion which had proved rebellious to treatment in the presence of a dacryocystitis if circumstances existed precluding extirpation of the sac.

Operations for After-Cataract.—Dr. Wendell Reber.

The conditions which "after-cataracts" present vary according as the healing of the eye has been complicated or uneventful. The simplest condition with which you will have to deal is an eye which has healed easily. Ophthalmoscopically with a plus 7 to plus 12 small opacities in the posterior capsule will be seen. For such condition a T or crucial incision is done.

Another cause of "after-cataract" is a proliferation from the remaining lenticular cells. It will give rise to a denser mass to deal with. If there is lenticular matter to deal with it may become massed on the anterior capsule. These three conditions, however, are reasonably easy to cope with. When iritis or cyclitis follows an operation, it is a different story; it almost surely compels some manner of secondary operation. About 40 per cent. of operated cataracts present some degree of post-operative iritis. I do not speak of transient conditions, I mean the condition that begins to develop about the 6th day after operation, this in spite of a very careful extraction and the most careful treatment of the case afterward.

When the eye has quieted down completely after an iridocyclitis and has so remained for two or three months, instead of a simple incision, it will be necessary to do an iridotomy. This may be done with De Wecker's scissors, or with Ziegler's iridotomy knife. With this instrument one can sometimes secure a very satisfactory pupil even though its edges be irregular. It is a difficult operation to do. If the knife is introduced too far back one doesn't get as good a fulcrum as if the entry point is 2 mm. in front of the limbus. The least traction exerted on the iris and ciliary body the better. No bandage should be applied but atropin and argyrol (20 per cent.) instilled at once, ice compresses applied to the eye and a course of calomel administered internally. This will usually prevent recurrence of the post-operative inflammation.

All iridotomies and capsulotomies or capsulectomies should be done under artificial light with strongly condensed illumination. Careful study of the field of operation (before operating) under condensed light is imperative if success is to follow.

The users of capsule forceps (capsulectomy) agree that they render unnecessary a secondary operation on the capsule. Recent reports would lend much probabability to this claim. This point is not yet absolutely proven, however.

DISCUSSION.

Dr. Zentmayer said that in cases of dense inflammatory membranes he would try the Ziegler operation and if this failed he would do the operation devised, he thought, by Kuhnt. A narrow Graefe knife is entered at the lower third of the cornea one mm. inside the limbus, the point is thrust through the iritic membrane at once, the blade is then carried parallel to and behind the iritic membrane until a point about one mm. from the opposite limbus is reached; it is there brought out through the cornea and a downward incision through membrane and cornea is completed. The iris incision usually springs open, giving a large opening; should it not have sufficient resiliency for this to result it may be grasped with forceps and brought out through the wound and there snipped off.

Dr. Reber: The suggestion encountered in many text-books that "prolapsed vitreous should be cut away with scissors and the toilet of the wound then completed" has always interested and amused me greatly. Most frequently the vitreous is semi-fluid and shows a disposition to flow all over the field of operation. To attempt to abscise such vitreous is to my mind a fearful waste of precious time. The average operator in the presence of vitreous loss is only too anxious to get the speculum out as quickly as possible and allow the eye to close. Usually the patient realizes that something has gone wrong and becomes unruly. After the eye has been held closed a few moments they may regain their composure. Then if the lids are very carefully opened and the corneal conformer I have described is introduced the situation is entirely under control. The iris may be returned and if so desired a corneal suture introduced. I have done this three times. There is nothing I know of that will afford the feeling of security thus gained. I am distinctly of the opinion that some day this will become an accepted procedure in ophthal-

mic surgery. Vitreous loss is admittedly the most formidable complication of the cataract operation and anything that promises prevention or control of this calamity demands our carefullest consideration.

D. Forest Harbridge, Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

A meeting of the Section was held on Wednesday, February 5th, under the presidency of Sir Anderson Critchett.

Mr. G. Coats showed a case of congenital mesoblastic strand adhering to and penetrating the cornea. He suggested that if, in early fœtal life, the amniotic fluid was not sufficiently developed, or was too scanty, the amnion might come into contact with the eyes which were prominent at the time, and might acquire adhesion to the developing eye. Mr. A. Rugg Gunn showed a case of persistent hyaloid artery with massive white formation obscuring the optic disc. Mr. A. S. Cobbledick showed a case of congenital deformity of the inner canthus. Mr. J. B. Lawford exhibited a case of disease in the region of the pituitary body. The bitemporal hemianopsia was indicative of pressure on the chiasma; the patient showed no definite evidence of acromegaly; he had loss of sexual power, and was very drowsy. Mr. R. W. Doyne alluded to the prognostic importance of ascertaining the color fields beforehand. Dr. Grainger Stewart pointed out that the patient had the two other features associated with the condition to which Cushing drew attention, namely, general pallor, and a long distance between the ear and the outer canthus of the eye. The President showed a patient on whom he had performed peritomy in a case of corneo-iritis, the whole of the vascular conjunctiva having been very much thickened. Mr. Bickerton (Liverpool), Mr. Cruise, and Mr. Rayner Batten referred to the good results sometimes yielded by the operation, as in this case.

The resumed discussion on the Physiology of Intra-ocular Pressure will be published in a later number.

ABSTRACTS FROM MEDICAL LITERATURE

By J. F. Shoemaker, M.D.,
St. Louis, Mo.

VALUE AND MANNER OF EMPLOYMENT OF CYANIDE OF MERCURY IN PREVENTION OR CARE OF EXOGENOUS OR ENDOGENOUS INFECTIONS OF THE EYE.

E. Grand-Clément (*Lyon Médical,* July 21, 1912) states that frequently repeated irrigations of the eye with a one to 2,000 solution of mercury cyanide for the three days preceding cataract operations eliminates all possibility of suppuration in the organ, first, by killing all microorganisms on the conjunctiva, and, second, by causing the formation in the interior of the eye of antitoxic bodies, preventing the action of any germs which might have gained entrance. Sub-conjunctival injections of the same solution constitute the most effective measure available to arrest or cure cases of chronic iritis or iridochorioiditis and, in particular, cases of atrophic chorioretinitis, for which hitherto no good remedy has been at hand.—*N. Y. Med. Jour.*

TREATMENT OF INTERSTITIAL KERATITIS BY SALVARSAN.

George W. Vandergrift (*Med. Record,* October 26, 1912) believes that salvarsan is by far our most efficient remedy in the treatment of interstitial keratitis. while the disease may be cured with mercury, it requires a longer time, during which connective tissue is likely to be deposited in the cornea which affects the ultimate vision. The action of salvarsan is so prompt and efficient that connective tissue is not formed, thus preventing the impairment of vision after the inflammation has subsided. In his experience salvarsan causes the absorption of the corneal infiltrate to a much greater extent than mercury, even after the inflammatory symptoms have subsided. While it will not cause the disappearance of the scars of a past interstitial keratitis, it will, if used when acute symptoms are present, check the inflammation and prevent the further formation of connective tissue.

BOOK REVIEWS.

CANCER, THE PROBLEM OF ITS GENESIS AND TREATMENT. By F. W. Forbes Ross, M.D. 1912, Methuen & Co. 36 Essex St., W. C., London, England: 5 shillings.

After a lengthy discussion of the genesis of cancer, which must be studied by the reader, and which is full of original thought, frequently at variance with generally accepted ideas, the author strongly recommends the treatment with large and continued doses of potassium salts (not iodide of potassium), or other alkaline salts and radium. With such treatment the author has not only succeeded in curing inoperable cases of cancer, but also in preventing recurrence after operation. A number of case histories apparently prove his contentions. The book is well worth a careful study.

PRISMS: THEIR USE AND EQUIVALENTS. With 118 illustrations, of which 18 are colored. By James Thornton, A.M., M.D. 1913, Philadelphia: P. Blakiston's Son & Co.

Like the previously published books by the same author, this treatise on prisms excels by its simple and clear diction. Starting out with general remarks on the nature of prisms and the refraction of light through them, he then describes their combination with sphericals and cylinders, either for continuous use or for treatment of muscular defects. The absence of mathematical formulæ, and the many illustrations make this little treatise especially valuable to the student. ALT.

SPECIAL MEETING OF THE BELGIAN SOCIETY OF OPHTALMOLOGY —August 2, 3, 1913. On the occasion of the Universal Exhibition at Ghent (April to October, 1913), the Belgian Society of Ophthalmology invites the foreign ophthalmologists to be present on the 2nd and 3rd of August next, at the Scientific Conference which it is organizing at Ghent, "the City of Flowers and Old Monuments." The Board of the Belgian Society of Ophthalmology begs their colleagues from abroad who intend to make any communication at this reunion to forward its title and summary, type-written if possible, to professor Van Duyse, 65, Rue Basse-des-Champs, Ghent, Belgium, before June 15, 1913.